

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

CAMBRIDGE.—At a Congregation on May 17, the Vice-Chancellor, the Master of Emmanuel, Professors Cayley, Adams, Clerk-Maxwell, Stuart; Messrs. P. Frost, St. John's; J. Todhunter, St. John's; H. W. Besant, St. John's; N. M. Ferrers, Caius; E. J. Routh, St. Peter's; A. Freeman, St. John's; H. H. Taylor, Trinity; W. D. Niven, Trinity; R. T. Wright, Christ's; C. H. Prior, Pembroke; W. Garnett, St. John's; and Lord Raleigh, Trinity, were appointed a Syndicate to consider the higher Mathematical Studies and Examinations of the University.

The Chancellor's gold medal, given annually to a resident undergraduate who shall compose the best English poem, has been adjudged to Edmund Whytehead Howson, Scholar of King's College. The subject of the poem is "The Heroism of Arctic Exploration."

The Moderators and Examiners for the Mathematical Tripos have presented a report of the results of the examination to the Board of Mathematical Studies, from which it appears that 110 candidates were examined. Of that number 36 were classed as Wranglers, 29 as Senior Optimes, 30 as Junior Optimes, one obtained an *Agrotat* degree, and 14 were found to be not worthy of mathematical honours. The full marks were 18,643; the average obtained by the first ten Wranglers was 5,748; of the last ten Wranglers, 1,794; of the first ten Senior Optimes, 1,506; and of the first ten Junior Optimes, 721. The Additional Examiner (Mr. H. W. Watson) reports that the work done by the best men in the higher physics was very satisfactory, and proved the interest and success with which those subjects are now being studied in the University. At the same time there were indications of the tendency of the reading in this part of the course to become too diffuse and unmathematical. This tendency may be kept in check, in the first place, by framing the papers in such a manner—whether by the adoption of alternative questions or otherwise—as shall make too diffuse reading in the higher subjects unprofitable or even impossible; and, in the second place, by providing that every question set in these subjects shall be accompanied by a rider of strictly definite mathematical character, and of a difficulty proportioned to the weight assigned to the bookwork.

The Board for admitting and superintending non-collegiate students give notice that an exhibition of 50*l.* a-year, tenable for three years, granted by the Worshipful Company of Clothworkers for the encouragement of proficiency in physical science, will be awarded by means of the Certificate Examination, to be held next December, under the authority of the Oxford and Cambridge Schools Examination Board. Candidates must be either non-collegiate students in their first term of residence, or persons who have not commenced residence in the University. Full information may be obtained from the Censor of non-collegiate students, the Rev. R. B. Somerset, Cambridge.

GILCHRIST TRUST PRIZES.—The first (in London) presentation of prizes in physiology under the direction of the Gilchrist Trustees was made on Tuesday, last week, at the large room of the Society of Arts. The chair was occupied by the Rev. J. Rodgers, M.A., Vice-Chairman of the London School Board, supported by Dr. Carpenter, C.B., F.R.S., secretary to the Gilchrist Trust Fund, and others. The prizes were awarded to students who, as elementary school teachers, had attended the course of lectures on physiology recently delivered by Dr. B. W. Richardson, at St. Thomas's School, Charterhouse, and who had submitted to the examination with which the course was brought to a close. A large number of students entered into competition, and in the end prizes and certificates were awarded in the following order to four competitors:—John Pilley, George Price, W. R. Cory, and Maria J. Menzies; and certificates to Mary C. Menzies and Messrs. C. E. Marks, C. W. Shreeve, H. Steadman, J. F. Adcock, and G. Garland. In the course of the proceedings Dr. Carpenter gave a very interesting account of the origin of the Gilchrist Trust and of its founder, and the chairman delivered a very earnest and admirable address on the progress of education and on the value of the lectures such as had been delivered, and which he had himself attended.

WORKING MEN AND SCIENCE.—On Saturday afternoon the members of the Working Men's Clubs, under the auspices of the Working Men's Club Union, paid a visit, by permission of the Royal College of Surgeons, to the magnificent museum founded by John Hunter, and attached to the building of the College

in Lincoln's Inn Fields. Prof. Flower, the Curator, received the visitors, who were conducted into the first great hall, where Prof. Flower gave a general description of the Museum. The visitors manifested an unmistakably genuine interest in the collection, and in Prof. Flower's descriptions, and at the conclusion of the visit one of the party, on behalf of his comrades, gave hearty thanks to the Professor and to the Council of the College, for the treat which had been afforded to them, and said it was altogether a mistake to suppose that the working men took no interest in science. The Professor said it afforded him much pleasure to show the museum, and especially so when he found his labours thus appreciated.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, May 3.—"On the Temperature-correction and Induction-coefficients of Magnets," by G. M. Whipple, B.Sc., Superintendent of Kew Observatory. Communicated by Robert H. Scott, F.R.S.

"Distribution of the Radicals of Electrolytes upon an Insulated Metallic Conductor," by Alfred Tribe, Lecturer on Chemistry in Dulwich College. Communicated by Dr. Gladstone, F.R.S.

May 17.—"On Hyperjacobian Surfaces and Curves," by William Spottiswoode, M.A., Treas. R.S.

Royal Astronomical Society, May 11.—Dr. Huggins, F.R.S., president, in the chair.—A gift of 500*l.* was announced from Mr. C. J. Lambert, being part of the sum bequeathed by his late father to scientific societies. The special thanks of the meeting were voted to Mr. Lambert.—The Astronomer-Royal pointed out an inaccuracy in a description of meteors by a certain "J. W. M."—Mr. Penrose read a paper (and explained a diagram) on the correction for the spheroidal figure of the earth.—Lord Lindsay spoke upon the two comets B and C of 1877. Winnecke's showed three bright lines on a weak continuous spectrum which he described. The president made some remarks thereon: there were two distinct spectra shown by comets; one was limited to two particular comets; the carbon spectrum was common to all the rest.—Lord Lindsay described the 4-inch heliometer which he had placed at the disposal of Mr. Gill for his expedition to Ascension to measure the parallax of Mars. The object glass was made by Mertz, and cut and mounted as a heliometer by Repsold; the pillar and equatorial mounting being that provided by Messrs. Cooke, of York, for an 8-inch telescope. The halves of the object-glass were moved in circular grooves by means of a handle near the eye-piece, so that they could be separated without putting the object out of focus. Several other details were pointed out, one of them being a movable wire screen adapted to equalise the light of two objects of different brightness under measurement. Mr. De la Rue admired the stability and rigidity of the instrument. The Astronomer-Royal would have had the declination axis and the polar axis twice as large. Mr. Gill vindicated the steadiness of Lord Lindsay's heliometer, and described an accident by which it narrowly escaped being smashed; which accident occurred through the instrument having been represented as an "universal equatorial," whereas it was nothing of the kind; the elevating screw having run out whilst being set to the latitude of ascension, the polar axis was shot out of its collar on to the floor. Mr. Gill then spoke upon the positions of the planets Ariadne, Melpomene, and Iris, and their special merit of having no sensible disc.—Dr. De la Rue again referred to the axes of the heliometer, which he said were eight times as strong as Repsold thought sufficient. The Astronomer-Royal said it was perfectly adapted to the purpose intended.—A note was read from Padre Secchi on an alleged fall of a meteorite in Italy which turned out to be untrue.—Mr. Lecky related how he had made a good artificial horizon by filling a blackened trough with glycerine.—A catalogue of double stars was presented by Messrs. Wilson and Seabroke, of the Temple Observatory, measured with a parallel wire micrometer and a power of 400. Mr. Dunkin said the only fault was the omission of the R.A. and N.P.D., which necessitated the use of two catalogues.—A note was read from Mr. Proctor referring to his chart of 3,976½ stars.—Mr. Green laid before the Society some paper impressed with blank discs to aid observers in drawing the features of Mars, so prepared that lights could be taken out with ease and precision.—Mr. Christie described Prof. Zenger's

solar eye-piece, which consisted of a prism with one lenticular surface, cemented to another prism of different density; the quantity of light reflected at the junction being in proportion to the difference of the density of the two glasses.

Linnean Society, May 3.—Prof. Allman, F.R.S., president, in the chair.—Three foreign members were elected, and Mr. James Paton, of the Kelvin Grove Museum, Glasgow, was likewise elected an ordinary fellow.—Specimens of abnormal primroses were exhibited and commented on by Mr. Alf. W. Bennett.—A paper on the perfoliate penny-cress (*Thlaspi perfoliatum*) was read by Mr. G. S. Boulger. This little plant has a very limited British area, viz., the neighbouring districts of Oxfordshire and Gloucestershire, and according to our author Wilts; thus equally belonging to the Thames and Severn Valley provinces. The altitude attained is from 360 to 500 feet above the sea-level.—A conjoint memoir by Prof. St. G. Mivart and the Rev. R. Clarke on the sacral plexus and sacral vertebrae of lizards was brought forward and discussed. They stated that it has of late been recognised that in any attempt to reply to the question, which vertebra of any lower animal answers to the first sacral one of man, the nervous quite as much as the bone relations require consideration. Our authors pass in review the researches of Gegenbaur and Hoffmann, and then proceed to describe their own dissections of the parts in question in the chameleon, green lizard, iguana, monitor, and others. Instituting a comparison of the parts in the Batrachia, and of the sacral region in birds, they, in a somewhat technical summary, announce that although often puzzling and complicated from occasional variations in species and otherwise, the true sacral vertebrae may be defined in all vertebrates above fishes, where hind limbs are well developed.—The Secretary read a paper on the genus *Alveolites* and some allied palæozoic corals, by Prof. Nicholson and Mr. R. Etheridge, jun. It seems from their researches that the name *Alveolites* covers many forms whose affinities, to say the least, are obscure. Discussing the characters and essential attributes of the genus in a historical résumé, they proceed by comparisons, microscopic and otherwise, to define certain groups coming under previous definitions of *Alveolites*. These are several species of the above and others of genera such as *Cenites*, *Brachypora*, *Chelites*, &c. But moreover they state that in several instances there appears much in common between certain groups of *Alveolites* and *Favosites*, so that future investigation may further necessitate the breaking down of what at present may be regarded as but meagre lines of demarcation.

Chemical Society, May 17.—W. Crookes, F.R.S., vice-president in the chair.—The chairman announced that an extraordinary general meeting would be held on May 31 at 8 P.M. The following papers were read:—On a slight modification of Hofmann's vapour density apparatus, by M. M. P. Muir and S. Sugiura. The authors propose to omit the india-rubber plate of the original apparatus, and mark off the height of the mercury by a cathetometer and a slip of gummed paper.—Note on the fluid contained in a cavity in fluorspar, by J. W. Mallet. The cavity was 6 mm. by 2.5 mm. by 1 mm.; it contained water and a bubble. On heating, the bubble became less mobile and the crystal showed signs of incipient splitting.—Examination of substances by the time method, by J. B. Hannay. The author has determined the loss sustained by various hydrates in equal and successive intervals of time, when submitted, in a Liebig's drying tube, to a current of air at various temperatures, and thus obtains evidence of the existence of hitherto unknown hydrates. Magnesium sulphate, when treated as above, loses 8 per cent. of water in five minutes at 100° C.; the loss is then much slower and regular up to 29 per cent., when the rate of loss decreases somewhat suddenly from the formation of a lower hydrate, which loses water much more slowly.—On the dehydration of hydrates by the time method, by W. Ramsay. The author examined the hydrates of alumina, iron, copper, and lead.—On the transformation of aurin into rosaniline, by R. S. Dale and C. Schorlemmer; by heating sulphuric acid and pure phenol, and gradually adding oxalic acid, pure aurin is formed; by the action of ammonia on aurin, red aurin is produced, which, by the action of alcoholic ammonia at 150° for several days is converted into rosaniline. The authors consider aurin to be identical with rosolic acid.—On certain bismuth compounds, Part VI., by M. M. P. Muir. The author describes the preparation, &c., of hypobismuthous oxide, bismuthous oxychloride and oxybromide, and sulphobismuthyl chloride.—On the theory of the luminous and non-luminous flame by J. Philippon. The author states

what he considers to be the causes of the luminosity and non-luminosity of flames.

Zoological Society, May 15.—Prof. Mivart, F.R.S., vice-president, in the chair.—Mr. Slater made some remarks on the progress and condition of the Zoological Gardens of Rotterdam, Amsterdam, Antwerp, Brussels, and Ghent, which he had just visited.—A communication was read from Mr. G. S. Brady, C.M.Z.S., containing a monograph of the fossil Ostracoda of the Antwerp Crag.—A communication was read from Dr. F. Day containing a notice of the capture of a specimen of *Coregonus oxyrhynchus*, on the coast of Lincolnshire.—A communication was read from the Marquis of Tweeddale, F.R.S., containing a memoir on the birds of the genus *Batrachostomus*. The author came to the conclusion that there were seven recognisable species of this difficult group inhabiting the Indian region, one of which yet undescribed, was from the Philippines. The rule appeared to be that the females were rufous from the nest, while the males are brown and somewhat spotted.—Mr. Edward R. Alston read the description of a shrew from Guatemala, which had been indicated without being characterised by the late Dr. Gray, and for which the name of *Sorex verae-pacis* was now proposed.—Mr. A. H. Garrod, F.R.S., read the second portion of a series of papers on the anatomy of passerine birds.—A communication was read from Mr. T. E. Buckley containing remarks on the past and present geographical distribution of the larger mammals of South Africa.

Entomological Society, May 2.—J. W. Dunning, F.L.S., vice-president, in the chair.—Messrs. H. J. Adams, Charlestrom, Adams, and J. W. Slater were elected members of the Society.—Mr. Jenner Weir exhibited a large silken cocoon from the Cape of Good Hope, supposed to be a spider's nest. On being opened it was found to contain, among other debris, the skins of a number of small spiders and the elytra of beetles of the genus *Moluris*. Mr. Weir also exhibited a spider's nest from Montserrat.—Mr. F. Grut exhibited a large species of *Chetifer* from North Spain.—Sir Sydney Saunders exhibited a spider (*Atypus sulzeri*) taken on Hampstead Heath, where it is found inhabiting tubes concealed under bushes. The tubes are about fourteen inches in length and extend about ten inches beneath the surface of the ground, the remainder projecting above the surface. The same or an allied species had been observed by Mr. Jenner Weir on the South Downs.—Mr. Champion exhibited a series of *Alaus paryssi* from Thaso Island.—Mr. C. O. Waterhouse exhibited specimens of the following insects from Tasmania:—*Dohrnina miranda* (Heteromorous beetle), *Creophilus erythrocephalus* (Staphylinidae), and *Forficula erythrocephala*. The two last species bore some mimetic resemblance to each other.—A paper was read from Sir Sydney Saunders on the adult larvae of the *Stylopidae* and their puparia, the author exhibiting specimens in illustration.—Mr. H. W. Bates communicated a paper on *Ceratiorhina quadrimaculata*, Fab., and description of two new allied species. Specimens of the new species and also of *C. morgani*, Westw., were exhibited.

Physical Society, May 12.—Prof. G. C. Foster, president, in the chair.—The following candidates were elected members of the society:—Capt. R. Y. Armstrong, R.E., Mr. W. H. M. Christie, Lieut. N. Darwin, R.E., Prof. E. Frankland, D.C.L., F.R.S., Mr. H. F. Morley, Capt. R. G. Scott, R.E., and Mr. Angus Weiss. Mr. S. P. Thompson read a paper on the chromatic observation of the eye in relation to the perception of distance. He discussed the various means of estimating distances by the eye, showing that when data for forming a judgment by the associations of visible form or visible magnitude fail, the judgment is founded on "aerial perspective," or else upon the muscular sensation of adjustment to focus. As the eye is, however, not achromatic, it cannot be in focus at the same time for red rays and blue rays proceeding from one object, but may be in focus if the blue rays come from a more remote object. This gives a definite basis to the axiom of painters that blue is a retiring and red an advancing colour. Experiments were described demonstrating the truth of this fact, and illustration was afforded of the chromatic aberration of the eye by casting beams of light through a solution of permanganate of potash upon a silvered ball, the illuminated point appearing red with a blue surrounding halo to an eye adjusted to short focus, but blue with a red halo to long focus.—Prof. Guthrie referred to the theory by which the apparent size of an object depends on the amount of nervous excitement which it occasions, whether this be due to the extent of the illuminated area or the

intensity of its illumination, and he pointed out that an object always appears larger when looked at with two eyes than with one eye.—Mr. Roberts drew attention to the fact that the system ordinarily adopted in mechanical drawing of assuming the light to fall from the left hand top-corner gives an appearance of solidity, whereas if this be reversed, and the light falls from the right-hand bottom corner the object appears hollow.—The president referred to the well-known fact that if two stereoscopic pictures are taken, representing the same object in complementary colours, most people have a great difficulty in combining them so as to see a single picture of a neutral tint.—Mr. S. P. Thompson then described a curious observation of change of pitch occurring when a tuning-fork is caused to rotate rapidly round its axis; the nodal interferences at each quarter rotation ceasing to be separately heard when recurring more than about thirty times in a second. He has attempted various ways of estimating the amount of this change of pitch, including a method founded on the binaural estimation of interference beats.

Institution of Civil Engineers, May 8 and 15.—Mr. George Robert Stephenson, president, in the chair.—A paper by Sir G. W. Armstrong, C.B., F.R.S., V.P. Inst. C.E., on the history of the modern development of water-pressure machinery was read.

CAMBRIDGE

Philosophical Society, May 7.—Prof. Clerk Maxwell, president, in the chair.—Mr. J. W. L. Glaisher read a paper on expressions for the theta functions as definite integrals.—Mr. Warren's fourth "Exercise in Curvilinear and Normal Coordinates" was presented to the Society by Prof. Cayley, and will appear in the next issue of the Society's *Transactions*.

PARIS

Academy of Sciences, May 14.—M. Peligot in the chair.—The following papers were read:—Isoperimetric triangles having one side of constant size and the summit at a fixed point, by M. Chasles.—Rotatory action of quartz on the plane of polarisation of obscure calorific rays, by M. Desains. He has examined the action of six groups of dark rays of decreasing refrangibility. The law of thicknesses still applies to the least refrangible rays. In the symmetrical dark region of nearly extreme violet the polarised heat is so little sensible to the action of quartz that transmission through a plate 0.015 m. thick, gives hardly a rotation of 5 degrees, or $\frac{1}{2}$ degree per millimetre. This is 132 times less than for the violet of M. Biot's table. M. Desains describes his apparatus fully.—Analysis of an ancient wine, preserved in a glass vessel sealed by fusion, by M. Berthelot. This was found on the site of an old Roman cemetery near Arles, and probably dates back some sixteen hundred years.—Analysis showed in a litre, 45 c.c. alcohol, 3.6 gr. fixed acids, 0.6 bitartrate of potash, 1.2 acetic acid. There were also tartrate of lime and traces of acetic ether. It is a weakly alcoholic wine, which must have entered on acetification before being put in the tube.—M. Serret presented tome vii. of the "Œuvres de Lagrange," completing the series.—On the new navigation, by M. Villarcen.—On the origin and nature of the fever called typhoid, by M. Guérin. The object of this third memoir is to show that the toxic principle produced by stercoral fermentation causes what are looked on as the anatomical characters of the fever. M. Guérin has proved that the liquids specially poisonous are those which accumulate near the end of the ileum, and are permanently retained by the ileo-cæcal valve. The poison passes into the mesentery and to the ganglions contained in it.—New exposition and generalisation of the method of Gauss for calculating approximately a definite integral, by M. Pujet.—New meteorological maps of the South Atlantic, giving at once the direction and the intensity of the winds, by M. Brault. The general movement of the summer winds there is that of an immense cyclone with its centre about 30° or 35° south latitude, and 10° or 20° west longitude. It turns in opposite directions to the hands of a watch, and gives off the south-east trades towards Africa, &c. There is not a zone of tropical calms, nor a zone of weak and arbitrary breezes.—On a new type of simple monstrosity, omphalocephaly or umbilical hernia of the head, by M. Dareste. The head seems to come from the aperture of the umbilicus. The form has been observed in the hen, but not in man or mammalia.—Experiments made at the vitreolar station of Cognac with the view of finding an efficacious remedy against phylloxera, by M. Mouillefert. This is in favour, specially, of sulpho-carbonate of potassium.—On a modification of the pneumatic mercury machine, by M.

Serret. This consists in substituting a simple valve for the glass stopcocks. In another form, even the valve is suppressed, and vacuum obtained by free circulation of mercury in simple tubes.—On solar spots, by M. Tacchini. He thinks the sun's surface at present in a true state of repose relatively to the great phenomena observed at a time of maximum sun-spots. He shows the contrast in metallic eruptions and spots between 1871 and 1876 by figures. In the first four months of 1877, he adds, there has been a diminution in the visibility of magnesium, so that the line 1474 κ has had a marked superiority.—On the otheoscope, (a new arrangement of the radiometer), by Mr. Crookes.—Direct transformation of mechanical work into electricity, by M. Guignet. In an electromagnetic machine, having six electromagnets and a drum with six bars of soft iron, the wires are connected with a galvanometer and the drum is rotated by the hand. A continuous current is thus produced, and it is reversed on reversing the rotation. This experiment also shows the induction taking place under the influence of the earth; the soft iron is magnetised, and the magnetisation increases with the speed of rotation.—Note on work in chemistry at the Polytechnical School of Rio de Janeiro, by M. Guignet.—On work of the School of Mines of Ouro Preto, by M. Gorceix.—On some monochlorised acids of the amylic series, by M. Demarçay.—On the salts of sesquioxide of chromium, by M. Etard.—Researches on pseudopurpurine; continuance of researches on the colouring matters of madder, by M. Rosenstiehl. The remarkable instability of pseudopurpurine (he says) is a happy circumstance; as neither it nor alizarine could give a plant the extraordinary importance of madder.—On an application of the microscope to ceramic art, by MM. Fouqué and De Cessac. This refers to vases found at Santorin.—On a new larval form of Cestoides, by M. Villot.—On granular conjunctivitis in Egypt; *résumé* of observations on ophthalmias of North Africa, by M. Gayat. Eye diseases are endemic in North Africa, and have their common origin in granular conjunctivitis, which is brought on by atmospheric and terrestrial conditions.—Treatment of hypopyon, by M. Fano.—On M. Maumene's gas hydrometer, by M. Dumas.—A new arrangement of the electromagnetic induction apparatus with automatic interruption, by M. Becquerel.—On the glaciers of Greenland, by M. Mallard.

ROME

R. Accademia dei Lincei, April 15.—The Age of Bronze in the piles of Peschiera in the Lago di Gardo, by M. Ferri.—On the use of the reversed siphon in the ancient conduits of water, by M. Lanciani.

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